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RECENT LITERATURE.

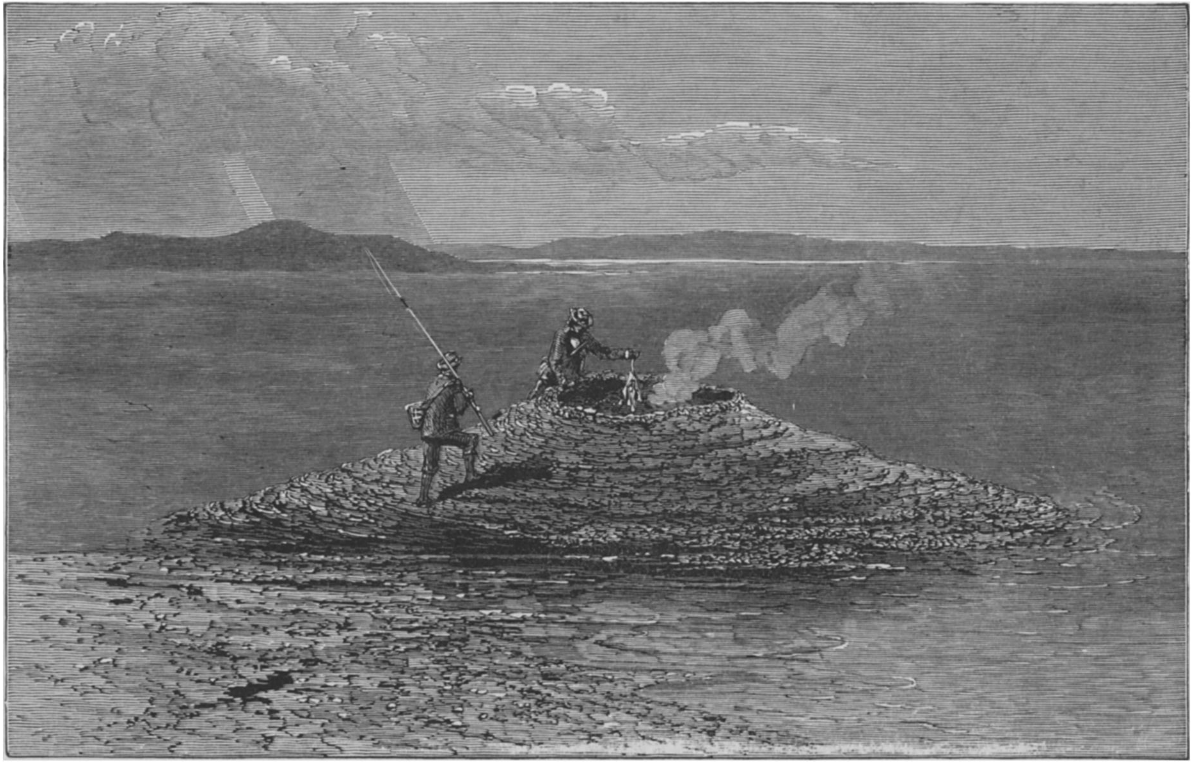
HAYDEN'S TWELFTH ANNUAL REPORT OF THE U. S. GEOGRAPHICAL AND GEOLOGICAL SURVEY OF THE TERRITORIES OF WYOMING AND IDAHO.—These bulky and very richly illustrated volumes form the last of a series of twelve annual reports covering as many years, from 1867 to 1879, and which is notable for containing a vast amount of valuable information concerning the geology and natural resources of an immense area lying west of the Mississippi valley and east of the Sierra Nevada range. It will be remembered that June 30, 1879, Congress passed a law discontinuing this and the two other surveys then in existence, and establishing what is now known as the United States Geological Survey.

Part I contains under the head of geology, seven illustrated articles by Dr. C. A. White, entitled Contributions to Invertebrate Palæontology, 2–7, the first having appeared in the report of the survey for 1877; with the report of Mr. O. St. John on the geology of the Wind River district, and of Mr. Scudder on the Tertiary lake basin at Florissant, Col., the latter being a reprint from the last volume of the Bulletin of the Survey. To return to Dr. White's articles, which are illustrated by thirty-one excellent plates, among the large number of new forms described the most remarkable are two coral-like Cretaceous forms with a Palæozoic aspect, one referred with a good deal of doubt to Chætetes, though the tabulæ are apparently absent, and it may be a Polyzoön; the other coral is referred with doubt to Beaumontia. Another palæontological fact of interest is the discovery in the Cretaceous rocks near San Antonio, Texas, of a very large crab's claw, described by Mr. Whitfield under the name of *Paramithrax walkeri.*

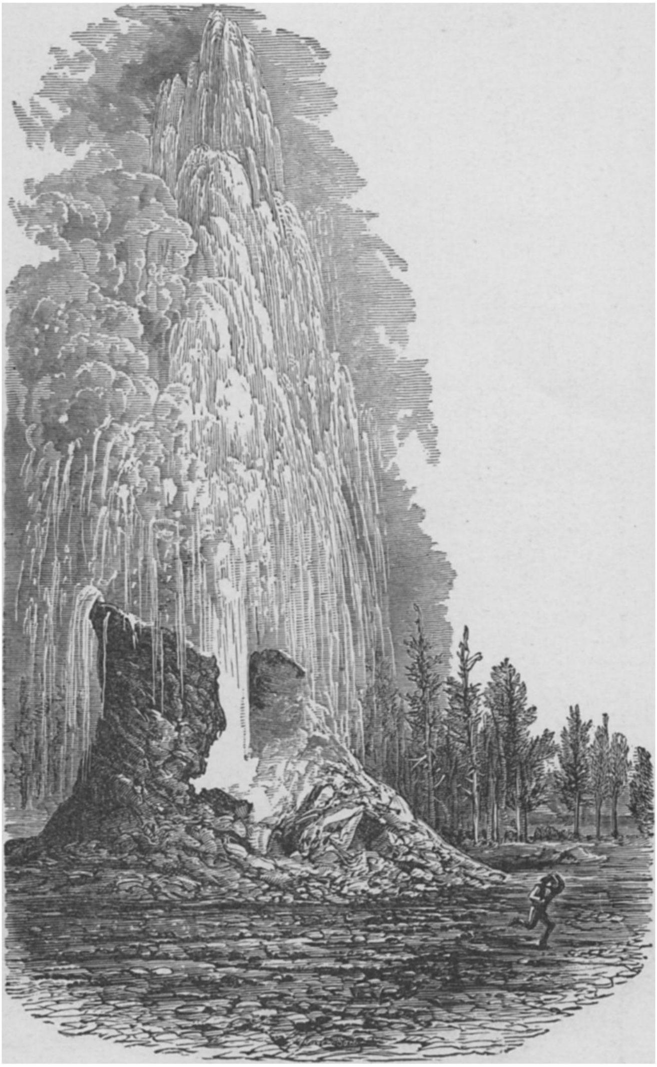
Mr. St. John's account of the geology of the Wind River district occupies eighty pages of the volume, and is richly illustrated with panoramic views and chromo lithographic plates by Mr. W. H. Holmes, whose sketches are unique for their wonderful presentation of geological and typographical facts combined. The frontispiece, giving a view of Pike's Peak and the Garden of the Gods, is an excellent piece of chromolithography; as good and faithful as we remember to have seen.

As Dr. Hayden remarks in the preface, the Wind River range proved one of remarkable interest. "It has a trend about north-west and south-east, with a length of about a hundred miles. On the west side all the sedimentary belts have been swept away, down to the Archæan, older than the Wasatch, and the latter formation rests on the Archæan rocks all along the base of the range, seldom inclining more than 5° to 10°. On the east side of the range the series of sedimentary formations usually known to occur in the north-west are exposed from the Potsdam sand-

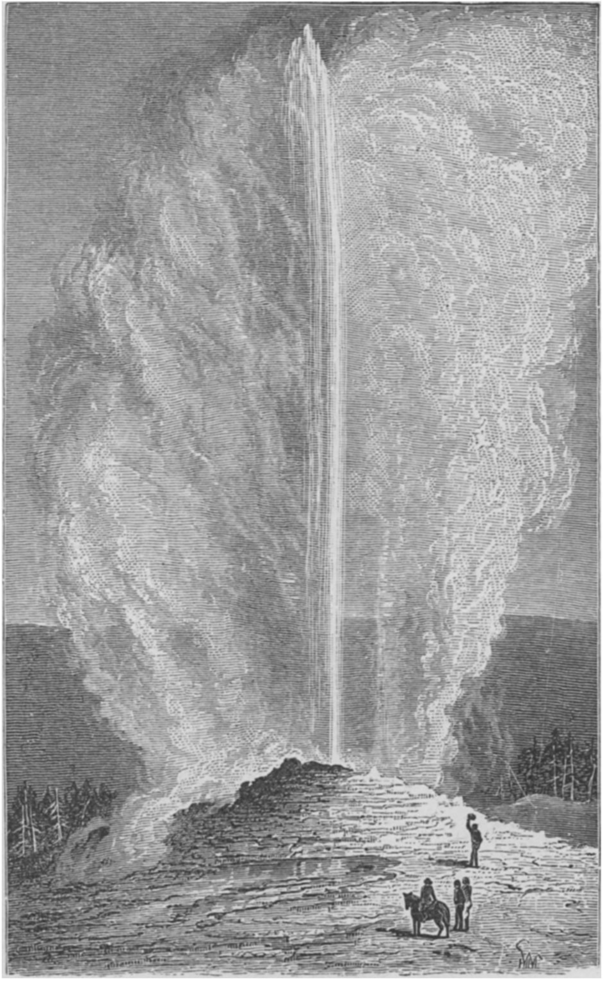
PLATE XX.



Hot Spring Cone on west arm of Yellowstone lake.

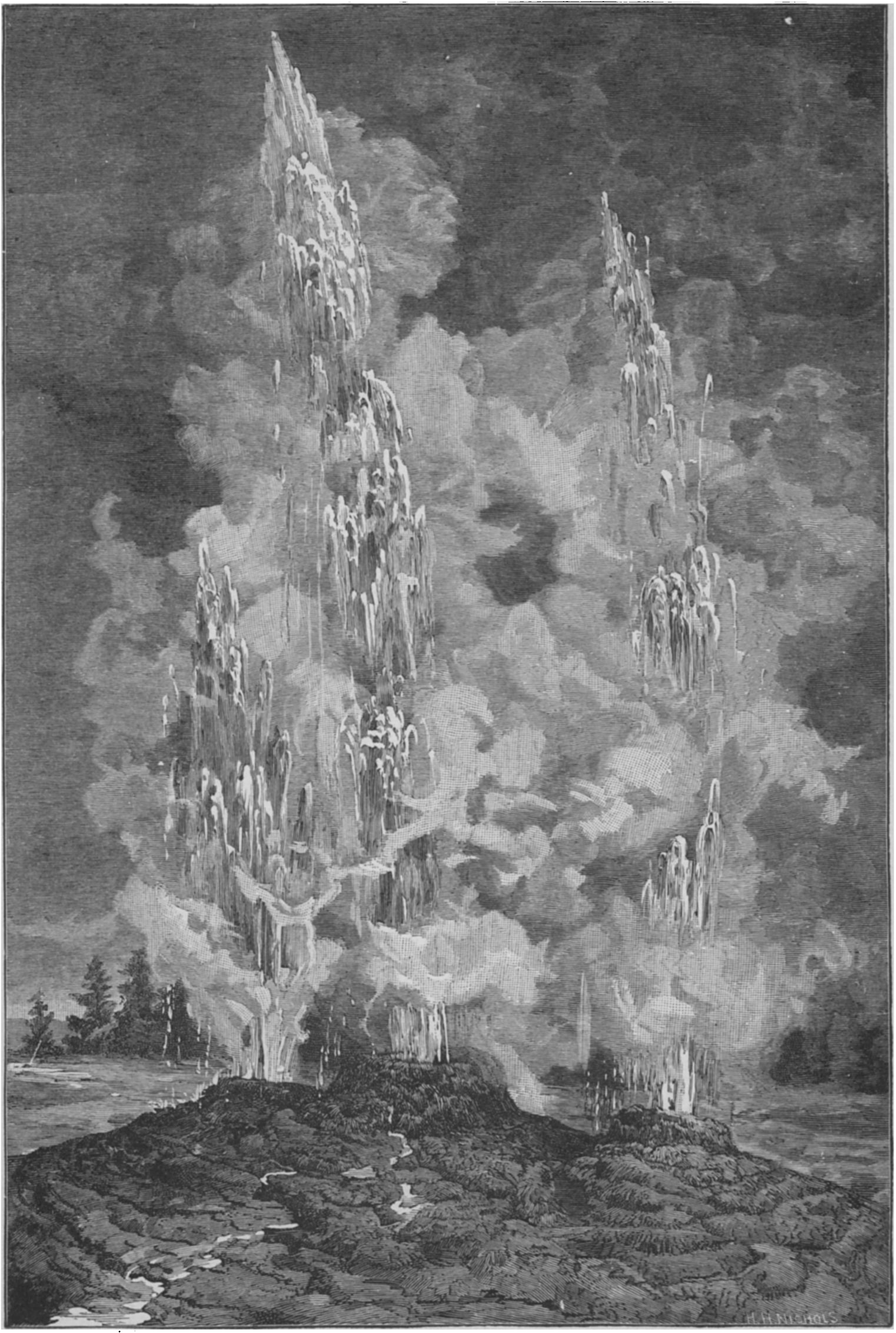


Giant Geyser in action.



Old Faithful Geyser in action, 1871.

PLATE XXIII.



Union Geyser in action, Aug. 21, 1878; 7.46 A. M.

stone, which rests upon the Archæan rocks, to the Cretaceous, inclusive." The range is regarded as a vast anticlinal of which one side has been entirely denuded of the sedimentary rocks, except the Middle Tertiary. On the same side of the range the morainal deposits and glaciated rocks are shown on a scale not met with by Hayden in other parts of the West. The most interesting discovery made by the survey in this district was that of three genuine glaciers on the east base of Wind River and Fremont peaks, the first known to exist east of the Pacific coast. The panoramic view on a large scale, by Mr. Holmes, of these glaciers, conveys an excellent idea of their appearance. That they were formerly much larger is shown by the moraines which were found on a grand scale in the Snake River valley, on the east side of the Téton range. The numerous lakes have been the beds of glaciers, and the shores of the lakes are walled with morainal ridges.

The second section of the volume is devoted to zoölogy, comprising a monograph by Professor A. S. Packard, Jr., of the Phyllopod Crustacea, one family of which is confined, south of the Arctic regions, to the United States west of the Mississippi river. It contains a chapter on the reproductive habits of the Phyllopods, comprising the life-history of *Apus lucasanus*, etc., by Dr. C. F. Gissler, and an appendix containing translations of the papers of Siebold and of Schmankewitsch on the transformations of Artemia and its relations to its environment. The essay comprises also a general account of the Phyllocarida, a new order of Crustacea of which Nebalia is the modern type, with a number of fossil forms usually referred to the Phyllopoda. The essay comprises 210 pages, and is illustrated by wood-cuts, and thirty-nine plates, with a colored zoögeographical map. This is followed by a series of five articles by Dr. R. W. Shufeldt, U.S.N., on the osteology of *Speotyto cunicularia*, *Eremophila alpestris*, of North American Tetraonidæ, of *Lanius ludovicianus excubitoides* and of the Cathartidæ. These are important contributions to a neglected subject, and are richly illustrated with numerous woodcuts and twenty-four lithographic plates.

The second part forms a bulky volume of 500 pages, and is entirely devoted to an account of the Yellowstone National Park, and its geysers. It is illustrated by several very effective chromolithographs, a number of excellent wood-cuts, several of which we are kindly allowed to reproduce (Plates XX–XXIII), a large number of Mr. Holmes' characteristic panoramic views, and numerous maps by Mr. Gannett, while in the atlas of maps is a large geological map of the park. The whole is a most thorough and timely monographic account of the park. It will be remembered that the idea of setting apart this large tract as a national park originated with Dr. Hayden.

The geology of the Yellowstone Park is by Mr. W. H. Holmes, who describes the structure of the Yellowstone valley and its tributaries as well as the mountain ranges; of these the two most important, the Yellowstone and Washburn ranges, are composed of volcanic conglomerates, the larger part of the park being underlaid by rhyolite. The greater part of the volume, which relates to thermal springs and geysers, is treated in a broad and comprehensive way by Dr. C. A. Peale, and is an important contribution to this attractive subject. After describing the springs and geysers of the park, he discusses thermal springs and geysers in general, including those of Iceland, New Zealand, those of other parts of the United States, those of Mexico, Central America, the West Indies and South America, as well as those of Europe, the Azores, Africa, Indian ocean, Asia Minor and Asia, with those of Japan, Formosa, Malaysia, Australasia and Polynesia. Thermo-hydrology is then discussed under the heads of thermal springs, the chemistry of thermal waters (by C. A. Peale and Henry Leffmann), their formations and deposits, and the chemistry of deposits (also by Peale and Leffmann); this part closing with an account of geysers and theories of geysers, followed by a full bibliography of the subject. Dr. Peale describes and tabulates over two thousand springs and seventy-one geysers. The preliminary work on the geysers and geology of this world-renowned park has now been accomplished, but years of careful scientific work will be required to fill out the details. The report closes with a geographical account of the park, richly illustrated with maps by Mr. Henry Gannett, and the report of this distinguished geographer is a model of conciseness and critical accuracy. The entire report does great credit to the conduct of this famous survey and to the energy and foresightedness of the distinguished director.

BROOKS' LAW OF HEREDITY.[1]—This work is an elaborate attempt at a solution of the difficult problem of heredity, the author's theory being in a degree based upon Darwin's hypothesis of pangenesis.

The plan of the book is as follows: After giving first an outline of the chief hypotheses which have been published in explanation of heredity, with reasons for rejecting them, the author presents briefly, in outline, a statement of his own theory. He then attempts to show that this theory furnishes a basis for the theory of natural selection, that there is no *a priori* reason for rejecting this theory of heredity, and that it furnishes an explanation of many well-known facts which the author claims cannot without it be seen in their true relations. Finally the author at-

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[1] *The Law of Heredity.* A study of the cause of Variation and the Origin of Living Organisms. By W. K. BROOKS, associate in Biology, Johns Hopkins University. Baltimore, John Murphy & Co. 1883. 12mo, pp. 336. With illustrations.